



Pinot's POWER PROFILE

In a gesture of unprecedented openness, Thibaut Pinot has published all his training and racing data from the past six years. *CS* takes a close look at his 29,000km-per-year regime

Words Max Glaskin Photos Graham Watson, Yuzuru Sunada, Offside/L'Equipe

When Thibaut Pinot stepped on to the Tour's podium in Paris last July, France roared for its new hero. In just seven years, he'd risen from being a promising junior to third in the world's greatest sporting event. The hopes of a nation landed squarely on the sinewy shoulders of a 24-year-old nature-loving, video-gaming, fishing fan.

There is now genuine belief that a Frenchman could finish in yellow — perhaps even as early as this year. The 2015 route plays to Pinot's strength, with five summit finishes and just a single individual time trial. The flat TT, Pinot's Achilles heel, is not only very short but luckily will be done and dusted on the very first day in Utrecht.

Was the 2014 success just a fluke for the young leader of FDJ, a team

that had never had a podium place in a major event in its 18 years of existence? If there are any such doubts, they should've been crushed just four months later when a remarkable document surfaced in an academic journal. It was a full-on scientific study of Pinot's power profile for six years and gives a unique insight into how a promising junior has progressed to being a Tour contender.

Never before has such information been published about any world-class athlete, let alone a top cyclist. The numbers reveal how far and how hard he rode, across every training session and every race. OK, it doesn't analyse the effects of the fascinating psychological exercises, such as wrestling in sumo suits to boost team spirit last November, yet it lays bare the physical progress from 2008 to 2013. ▶▶▶

“The table shows how his power has increased at each intensity over every duration”



Data like this is the kind most competitive sports people keep close to their chest, fearing their rivals would benefit from the knowledge. Pinot, however, is happy that it's been published — by Julien Pinot, his coach and older brother, and Fred Grappe, FDJ's coach and director of science.

This mass data-capture began when Thibaut Pinot was an 18-year-old amateur riding for CC Etupes. Instead of spending money on flash carbon wheels, he fitted an SRM power meter and computer to his bike. He's had the same equipment on all of his road bikes since then, with coach and brother Julien calibrating the system three times a year to make sure it remained accurate. It failed only once, for two weeks in 2009. At other times, interference by signals from TV camera motorbikes and others corrupted some data; overall, though, 95 per cent of what was gathered is a reliable record of Pinot's efforts over six years.

In that time, it recorded 2,208 sessions: 1,727 training rides and 481 competitive rides, including 68 time trials. Few other cyclists, if any, have such a complete history. It shows that the time he spent on a bike each year almost doubled from 2008 to 2013, as did the difficulty (or training load).

PINOT'S INCREASING WORK RATE			
Year	Hours on bike	Training load	Distance (km)
2013	943	291608	29,340
2012	855	269278	26,932
2011	876	268674	27,722
2010	840	257938	26,355
2009	758	231380	22,717
2008	526	159165	14,654

Diminishing returns

Everyone who's tried to diet or get fitter knows it's easiest to make the biggest changes initially, and it becomes increasingly hard to make significant gains as fitness builds. This is certainly true for Pinot's training input. The hours increased by 60 per cent between the ages of 18 and 20 and the training load by 62 per cent. After that, his workload went up by less than 10 per cent each year.

It's unlikely there was much change from his 2013 hours and load in 2014, and it'll probably be similar this year. "It'll be difficult to increase the amount of work in the coming years," Julien Pinot tells *Cycle Sport*. "However, it's more on

Above: Pinot's training data is the first from a world-class athlete to be made public
Right: Recording his first Tour de France stage win in 2012 after a tenacious individual breakaway to Porrentruy



the quality of sessions that some changes will have to be made to allow him to continue to progress."

It's all very well harvesting millions of numbers, but it's no use until they're turned into something that can help understand how the rider is doing. So the uploaded data has been crunched to calculate Thibaut's power output in terms of watts (W) for every kilogram (kg) of his body weight. As he matured, his optimal weight increased from 62kg in 2008 to 65kg before the end of 2012.

The tables show how Pinot's power has increased at each intensity over every duration. The sessions have been split into five zones of increasing intensity, ranging from the equivalent of a transition stage of rolling along for several hours, to short sharp maximal bursts of just a few seconds. The duration at each intensity is also key.

Julien was happy to reveal more than just the figures. He's discussed the training programme, Pinot's weaknesses and the ways they have been addressed.

Winter training

After a six-week break at the end of last season, Pinot got stuck into 12 weeks of preparation, of which about two thirds are spent on the road bike. It includes cycling at low to moderate intensities and strength training. "What you have to understand is that there's a progression in Thibaut's winter training. No one day is identical to another. There's progress in the length and also in the intensity," says Julien.

By mid-January, he was putting in 30 hours a week, 70 per cent of which was for endurance. "The qualitative work

In the zone with Thibaut

ZONE 1 — MODERATE EXERCISE INTENSITY			
Year	Power output w/kg		
	for 4hrs	For 3hrs	for 2hrs
2013	4.9	4.9	5.0
2012	4.6	4.7	4.8
2011	4.3	4.6	5.1
2010	4.3	4.6	4.7
2009	4.5	4.6	4.7
2008	3.7	4.3	4.7

ZONE 2 — HEAVY EXERCISE INTENSITY				
Year	Power output w/kg			
	for 60min	for 45min	for 30min	for 20min
2013	5.7	5.9	6.1	6.4
2012	5.6	5.8	6.1	6.5
2011	5.5	5.6	5.8	6.2
2010	5.3	5.4	5.7	6.0
2009	5.1	5.5	5.8	5.9
2008	5.0	5.2	5.4	5.7

ZONE 3 LOW PART OF SEVERE INTENSITY		
Year	Power output w/kg	
	for 10min	for 5min
2013	6.9	7.2
2012	6.8	7.4
2011	6.6	7.2
2010	6.7	7.2
2009	6.4	6.9
2008	6.0	6.4

ZONE 4 - HIGH PART OF SEVERE INTENSITY		
Year	Power output w/kg	
	for 60sec	for 30sec
2013	10.5	13.0
2012	9.9	12.4
2011	9.3	12.5
2010	9.3	13.2
2009	9.4	13.0
2008	9.6	11.9

ZONE 5 - EXTREME INTENSITY		
Year	Power output w/kg	
	for 5sec	for 1sec
2013	18.1	19.3
2012	19.0	20.4
2011	17.4	18.7
2010	17.6	18.4
2009	17.1	18.3
2008	17.3	18.1

is about how to improve his rhythm and tempo at his climbing speed," says Julien. He's been mixing it with technical work, improving his ability to dance lightly on the pedals and keeping it at a low cadence but just below his maximum force.

About once a week, he rides a time trial on the flat — probably preparing for a good start on the first stage of the Tour de France. While most of his winter riding was on climbs, including short, all-out sprints of a few seconds to practise for attacks and counter-attacks, each week he spent five or six hours on the flat.



“The challenge of this year is to make progress so he can deal with attacks and rhythm changes”

A favourite winter training haunt of FDJ is Calpe in Spain where the climate is kinder than home territory. Before Christmas, he joined the French national team for a few days and it included an ascent of the iconic Tour peak, the Col du Galibier, although this time it wasn't made by bike but on snowshoes.

Now the season has started, his training is divided into three 'macro-cycles', each of up to six weeks of road cycling workouts, a mix of high volume and high intensity, with two to three weeks of 'goal' races, which are

preceded by tapering and followed by up to two weeks of recovery.

Climbing

Pinot was born and raised in the Vosges mountains of eastern France, so long, steep ascents are his playground. "I love to have fun in the climbs. That's bike riding the way I see it," he said after last year's Tour. It was only right that he finished brilliantly on La Planche des Belles Filles on Bastille Day — it's the summit nearest his home and on which he's trained for years. He came second, 15 seconds behind Vincenzo Nibali.

Interestingly for such a natural climber, Pinot has room for improvement in this area, Julien says. It's responding to the variation in rate of climbing that has been the problem. "The challenge of the coming year is to make progress so that he can deal with attacks and changes of rhythm of the

best climbers; [Alberto] Contador, Nibali and [Nairo] Quintana."

"We know we can still improve his training model so he can better tolerate and deal with changes of speed in the final climb — where it's tempo-attack-tempo-attack," says Julien. He draws a veil over how they'll do this. "It's a sensitive matter to reveal exactly the specific sessions and our methodology in this field. It's part of the secret of his preparation which is best kept confidential," says Julien.

Descending

Unless there's a summit finish to a stage, what goes up must come down. Frustratingly, the mountains of power data collected can't reveal anything scientific about Pinot's descending because much of it is due to freewheeling and technique. Yet, getting rider feedback about the stress of approaching

Gone to press

Why publish?

Won't Thibaut Pinot's rivals use the information to their advantage? Julien Pinot disagrees. "We're proud to be the first to publish the record power profile of a world-class athlete, showing the development of an athlete from the junior to top world level. Outside cycling, this type of study is very rare in scientific literature and it's important for understanding the development of the performance capacity of a top athlete," says Julien.

"We want to be completely transparent so we're giving credit to Thibaut's performance," says Julien, "We also wanted to show how Thibaut had arrived at this level via the methodology of the record power profile." Both Julien Pinot and FDJ coach Fred Grappe believe that recording power profiling alongside biological passports will help reveal cheats.

"As for helping Thibaut's competitors, I'm not sure it can, since we don't yet know if he's reached his limits," says Julien, for whom the research formed part of his doctorate. "The study was finished in 2013 and the data produced since then, particularly in the Tour de France, shows his progress hasn't reached its end yet.

"It's more the methodology with the details of sessions and training cycles which deserve to remain confidential, rather than the power data produced while competing."

Centre: During the 2013 Tour de France where he went on to finish a disappointing 52nd
Far left: Continuing to compile the stats during stage six of the 2012 Tirreno-Adriatico
Left: Pinot has been an advocate of the SRM power meter since his amateur days

hairpins at 50mph with a sheer drop beyond can help in planning training to make descending swifter.

This will be crucial for Pinot's major stage race goals because his descending has been perceived as significantly flawed. On the first Pyrenean stage of the 2013 Tour de France, he lost his nerve on the descent from Port de Pailhères, losing two minutes in 18km and fatally wounding his chance of a top-10 finish in the GC. A week later, he retired after finishing 80th on Mont Ventoux.

So how has Pinot been dealing with this crucial challenge? "Surprisingly for a cyclist, he uses downhill skiing to improve his descending," says Julien. He may also expect more support from his team-mates. If other FDJ riders can stay with him over the top, they could shelter him from the distraction of rivals so he can descend more calmly. ▶▶

As for tips and advice, it's been said he sought words of wisdom from a top mountain biker and, curiously, from a cycle tourist he met by chance while out training. Make of that what you will.

Altitude

Pinot's coaches will be looking at how he can do more training at altitude because of its perceived benefits when returning to race at lower levels. It can allow the blood to carry more oxygen to muscles, though it can also disrupt sleeping patterns.

The published study has revealed that Pinot's VO2 max, the peak volume of oxygen he can take in and use effectively, is 85 millilitres per minute for every kilogram of body weight (85mL/min/kg). This is very high, though occasionally elite athletes record figures as high as 90mL/min/kg. To put it in context, brother Julien's VO2 max was 79mL/min/kg when, as a promising cyclist, he last had it measured. A heart condition made him quit competing and

Right: Nervous descender Pinot has taken up skiing in a bid to overcome his fear

Below right: At 24, the Frenchman has barely scratched the surface of what promises to be an illustrious career



Pinot's palmarès

The naked cyclist

Born: 29 May 1990, Melissy, Haut-Saone region, France

Optimal weight: 65kg

Height: 1.8m

1998 First competitive race

2008 Started competing at international level in the under-19 category

2009 Joined CC Etupes

2009 Winner Giro de Valle d'Aosta, youngest ever winner

2010 Turned pro with Francaise des Jeux

2010 5th Tour de L'ain

2011 1st Settimana Ciclistica Lombarda

2011 3rd Tour of Turkey

2012 10th Tour de France

2013 7th Vuelta a España

2013 4th Tour de Suisse

2014 3rd Tour de France

Credit: A six-year monitoring case study of a top-10 cycling Grand Tour finisher by Julien Pinot and Frederic Grappe, published in the *Journal of Sports Science* (2014).

switch to coaching. "I had less talent, less mental strength and was less healthy than my brother," says Julien.

There are, though, limits to what can be done with VO2 max. While it's possible to make some improvements to this area of physiology, about half of the potential to change one's VO2 max is genetic — inherited from your parents.

Time trials

Bernard Hinault was not alone when, early in 2013, he questioned Thibaut Pinot's ability to time trial and speculated that it would prevent him from winning the Tour de France. The previous year, Pinot had struggled to finish in the top third in each of the race's three individual time trial stages.

His coach knows this as well as anyone. "Since he became a pro in 2010,

he's had to include progressively a programme of time trials," says Julien, keen to share positive outcomes. "Above all, it's in the discipline of time trialling that he's made progress in the last three years because we've accentuated the work in that area, whether that's in the way of his position but also on his training with his time trials bike."

Getting Pinot to adopt the optimum position for time trialling hasn't been easy. "He doesn't have the ideal body shape for penetrating the air, and that will limit his progress. He has a short torso, long arms, wide shoulders and a rounded back. We know we can do further work to improve it," says Julien.

To scotch doubts, he duly came ninth in the stage nine individual time trial (26.8 km) at the 2013 Tour de Suisse and 15th in the Vuelta time trial stage (38.8



km), which helped him to seventh in the final GC. In December of that year, tests in the Roubaix velodrome helped improve the balance between aerodynamics and performance.

By the start of the 2014 Tour de France, he'd built a good friendship with the clock. He may have lost 45 seconds and his second place overall to compatriot Jean-Christophe Peraud on the penultimate stage's 54 km individual time trial into Périgueux but he was rightfully satisfied with finishing 12th that day.

"I'm not surprised about my good result," he said afterwards. "All year I rode good time trials." The positive attitude is as significant an improvement as the physical gains. "The work allows him to increase his power in his time trial position and he gets more and more pleasure out of it, which is important," says Julien. He was working on it in the Roubaix velodrome again last December.

Extra elements

Thibaut doesn't use the gym for muscle training — most of his strength work is done on the bike, says his coach. But he does muscle reinforcement and core strength exercises twice a week at home, along with one session of mountain biking every week.

It's not just the physical aspects that Pinot's working on. "We know he needs to progress in tactics to be even more successful in stage racing, such as his position in the peloton, managing the transitional stages, managing stress and leadership," says Julien.

Staying calm when under attacks and keeping his mind clear during descents will be key, but he won't be indulging in visualisation, where a rider pictures in detail the race route. "Rather than using techniques of mental imagery, we try to limit the potential of surprise on the route. So we give Thibaut the maximum amount of information — data, images, videos — about the key points of the course, such as approaches to the passes, the gradient, width of the road, changes of altitude, changes of slope and descent." **END**